

White Sturgeon Conservation in the Columbia River

By Jill Cady, Hatcheries Division Admin Assistant

White sturgeon (*Acipenser transmontanus*) are the largest and longest-lived species of freshwater fish in North America. White sturgeon often live for more than a century, reaching lengths of 19-feet and weighing up to 1,800 pounds. With their prehistoric look, it is no surprise that these fish have remained virtually unchanged for 175 million years.

White sturgeon are anadromous, but unlike salmon can spawn multiple times throughout their lives. Females can produce anywhere from 100,000 to over one-million eggs each. Female sturgeon spawn every four to eleven years, although the number of eggs generally increases as females age, while spawning years grow further apart. White sturgeon are broadcast spawners, and fertilized eggs hatch in four days to two weeks, based on water temperatures.

For a species of fish that have survived ice ages, flooding, volcanic eruptions, and mass extinctions, it is astonishing that white sturgeon have gone from flourishing to endangered in just the past 125 years. While the reasons for the white sturgeon's decline are not entirely clear, many of the threats are specific to human development. In the late-1800s white sturgeon were overfished for sport, food, and eggs (to make caviar). Hydroelectric dams, water diversions, and various land use practices have also greatly affected their natural habitat.

One of the biggest challenges facing white sturgeon recovery on the Columbia River include recruitment bottlenecks in the reservoirs where the 50+ year old fish spawn, but survival to age-one and beyond is low to non-existent. To combat this bottleneck, supplementation programs have been developed to raise fish in the hatchery for their first year. White sturgeon mature slowly, which provides unique trials in managing a supplementation program that must make decisions today for results that will not be seen until 20-30 years in the future, as hatchery-raised fish begin spawning.

In 2001 and 2002, the **Chelan County Public Utility District (PUD)** commissioned a mark/recapture study to better understand the resident population of white sturgeon in the Rocky Reach Dam Reservoir. These findings estimated the population at 50-115 sturgeon, including juveniles. The White Sturgeon Technical Group was formed in 2004. It is comprised of stakeholders from Washington State, federal and tribal agencies, and Chelan County PUD biologists, to advise and coordinate the effort to develop the *Rocky Reach Comprehensive White Sturgeon Management Plan (WSMP)*. The *WSMP* was completed in 2005, with the objective of increasing white sturgeon populations at the Reservoir by determining appropriate harvest rates, the effectiveness of hatchery supplementation, identifying the available habitat, and determining natural reproduction potential in the reservoir.

In 2003, the Co-managers (WDFW, **Spokane Tribe of Indians**, and the **Colville Confederated Tribes**) initiated a program to support the white sturgeon recovery efforts started in 2001, in

Continued on pg 5

The Intake: July 2013

Inside this issue:

| | |
|--|---|
| <i>Semi-Annual Division Meeting</i> | 2 |
| <i>Re-Organization Plan for Hatcheries Leadership</i> | 2 |
| <i>Human Resources Fish Support Team</i> | 3 |
| <i>Auto-Tagging Trailers</i> | 4 |
| <i>Spokane Complex plays an important role in the JLARC Audit</i> | 4 |
| <i>Sol Duc Hatchery conducts drug trials for parasite prevention</i> | 8 |
| Regular Columns | |
| <i>Catie-Kelly Corner</i> | 7 |
| <i>AFS Update</i> | 7 |
| <i>Staff Happenings</i> | 7 |



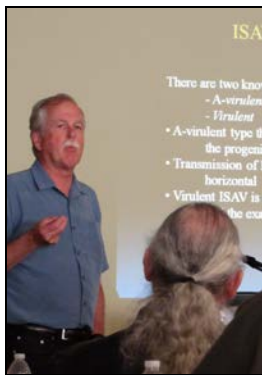
Left: Juvenile white sturgeon. Right: Female sturgeon below McNary Dam. Photos: Jill Cady

Region 6 Hosts Hatcheries' Semi-Annual Meeting

Region 6 hosted the WDFW Hatcheries Spring Meeting on April 23, 2013. The meeting was held in Guesthouse Inns and Suites in Elma. A total of 80 staff attended.

Presentations included the reorganizational changes in both the Hatcheries Division (see [sidebar](#)) and Human Resources (see article on [pg 3](#)), as well as an update on the JLARC audit (see article on [pg 4](#)). After lunch, **Amilee Wilson** from NOAA-Fisheries spoke about NOAA's perspective on the Hatchery and Genetic Monitoring Plans (HGMPs); **Bob Leland**, Steelhead Program Manager (Fish Management/Planning Modeling and Verification Unit), talked about the *Statewide Steelhead Monitoring Plan*; and **Mike Gross** talked about the Snider Creek/Bogachiel Winter Steelhead Program. **John Kerwin**, Science Division/Conservation Biology talked about current events in Fish Health.

All of the presentations are available on the Hatcheries intranet page at: <http://inside.dfw.wa.gov/programs/fish/hatcheries/>



Hatcheries Reorganization

By Kelly Cunningham, Deputy AD, Fish Program

At the Hatcheries Semi-Annual Meeting, I laid out our plan to address resource gaps identified during our Leadership Series. Part of that plan included a reorganization of staff duties in support of our mandate to achieve 100% compliance with HSRG broodstock management standards. The reorganization focuses on Regions 4 and 6, as these are where our largest gaps were identified, and where the heavy lifting with respect to the HGMPs resides.

Headquarters – Olympia (NRB):

- **John Kerwin**, along with the **Fish Health and Coded-Wire Tag labs**, will be moved out of the **Science Division**, and will report directly to me. John will also assume responsibility for Hatcheries Capital Projects and maintenance. These changes are effective June 1.

Region 6:

- **Neil Turner** will take over as Hatchery Operations and Reform Coordinator for **Region 6**, effective July 16.
- **Doug Hatfield** is seizing an opportunity and will be retiring in August, earlier than previously expected. This will provide an additional opportunity to create another Operations and Reform Coordinator position, which was to be assigned to **Region 6**. We will recruit for this position at the appropriate time.
- **Jon Anderson** will assume additional Hatchery Reform responsibilities for **Region 6**. This will occur in the very near future.

Region 4:

- **Brodie Antipa** will assume Hatchery Operations and Reform Coordinator responsibilities for the southern half of Region 4.
- Funds from the Hatcheries Division Manager position, vacated by **Heather Bartlett**, were used to create a Operations and Reform Coordinator position for northern Region 4. A recruitment announcement for this position was posted in June. In response to Doug's looming retirement, Brodie Antipa will fill in for Doug until the Region 4-North position is filled, and a new incumbent is up to speed. I hope that this will happen by late-summer/early-fall.

These changes represent an initial step in addressing the resource gaps.

What's New in Human Resources?

Non Perms to Permanent Career Seasonal Positions

By Walter Bracy, HRC4, WDFW Human Resources

WDFW recently began to look at ways to streamline our positions and reel in costs associated with vacancies and positions. One of those ideas is to begin to combine non-permanent positions into longer-term permanent Career Seasonal positions. Where it is economically feasible and makes sense to your program need, look at the option of creating long-term Career Seasonal positions. If you would like to explore this option, please contact your HR Program support.

Meet the New Human Resources Fish Program Support Team!



Walter Bracy, HRC4. I am the Senior HR Consultant for the Fish Program. I supervise the Fish Program HR team and support all areas of HR including Hatcheries, Fish Management, and Fish Science. I have been with the State of Washington since 2007. Prior to joining WDFW, I was at DSHS and Parks briefly. I have been a generalist my entire career providing advice and counsel on topics as broad and diverse as labor relations, contract interpretation, WAC and policy application, Reasonable Accommodation, FMLA, Washington Law against Discrimination, Harassment Prevention, Talent Management, and Just Cause, to name a few. In my free time, I love to spend time with my wife and two young boys, get outside fishing and camping, cooking, and train Gracie Barra Brazilian Jiu Jitsu.



Shelly Madison, HRC3. I support Hatcheries, Fish Management, and Fish Science. I lead the processing functions, provide consultation, and backup where needed. I have been with the State of Washington for 23½ years providing customer service. I spent the majority of my state career with the Department of Corrections, in Records, and decided to make a career change to Human Resources in 2008. My husband and I have four children between us: three boys, ages 23, 22 and 18, and one girl, age 21. All have moved out of the house except the youngest, who just graduated high school this year, and will be attending community college. My husband and I are now looking forward to traveling to all the places we want to go!



Margaret Gordon, HRC3. I've been with the Agency since 1999. I supported the Hatchery Division until 2007, when I became the recruiter for the whole agency. In August 2011, I became the recruiter for Fish Program.

Diana McCutcheon, HRC1. My first position with the State, twenty three years ago, was as a non-permanent Clerk Typist 2 with the Department of Fisheries, in Habitat Management. I left to take a permanent position, but promised I'd be back! After spending time with the Department of Transportation and the Office of Administrative Hearings, I returned to WDFW in July 2011. Marnie West and I process all Personnel Actions for Fish and Hatcheries. If you have a question, give us a call and we will try our best to get you an answer or direct you to someone who knows.



In my spare time, I enjoy camping, photography, geocaching and taking my yellow lab to the beach.

Contact Information

Walter Bracy: 360-902-2284, Walter.Braczy@dfw.wa.gov

Shelly Madison: 360-902-2266, Shelly.Madison@dfw.wa.gov

Margaret Gordon: 360-902-2209, Margaret.Gordon@dfw.wa.gov

Diana McCutcheon: 360-902-2852, Diana.Mccutcheon@dfw.wa.gov

Marnie West: 360-902-2285, Marnie.West@dfw.wa.gov

Marnie West, HRC1. I answer calls, emails and all sorts of questions and concerns from the field. Diana McCutcheon and I review all materials on new hires, as well as updates on long-time employees. We process all Personnel Actions into the system, maintain employee personnel files, and manage the mountains of paperwork that comes into the office for the Fish Program. I have been with the State going on four years, most of which was spent in Payroll, before coming to Fish and Wildlife.



Before that, I was a travel agent for over 11 years.

I am a proud single mommy of one amazing 10-year old boy. He keeps me extremely busy; along with our new Siberian husky puppy, who is busy eating his way through furniture, shoes, toys, and the occasional book. My hobbies include travelling, cake decorating, and scuba diving.



Coded Wire Tags and the Auto Fish System By Gary Marston, HEAT Unit

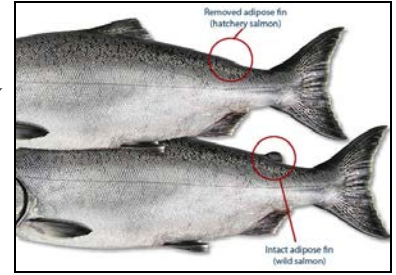
Each year across Washington, around 120-million hatchery-reared salmon and steelhead are mass-marked (adipose fin-clipped), and 18-million are coded-wire tagged (CWT). Mass-marking provides an easy way to visually identify hatchery fish in fisheries, at hatcheries, or on the spawning grounds. CWTs are an essential tool for fish management: they allow WDFW staff to evaluate hatchery performance, monitor stray rates and can be used to determine smolt-to-adult survival rates and contributions to specific fisheries. These data provide information that helps managers set production levels, establish fishing seasons and exploitation rates, and draft Hatchery and Genetic Management Plans (HGMPs).

While the task of marking the huge numbers of Chinook, coho and steelhead released from WDFW facilities is, itself, daunting, the job is further complicated by time constants due to fish size, water temperatures, smolt migration timing. Manual methods of clipping and tagging, alone, cannot process the numbers of fish required. To accomplish this annual feat, starting in early-spring and throughout the fall, WDFW sends Auto Fish Systems (auto trailers) to hatcheries statewide (see also *Intake: March 2013*). The marking schedule depends on a variety of factors, which includes the age at release, stocks and species being tagged, water sources at the facilities (fish at warmer water facilities are typically marked the earliest), and fish growth profiles.

Most of WDFW's auto trailers are six-line models, which allows the operators to quickly sort, clip and tag salmonids ranging from 57-mm to 142-mm without the use of anesthetics or human handling. Beyond the initial transfer into the trailer, the fish are not dewatered throughout the marking and tagging process. Fish should be kept off of feed for at least 24-hours prior to marking or tagging, as feeding the fish may reduce the dissolved oxygen level in the water, and fed fish often become stressed and regurgitate the feed. Also, starved fish move through the marking and tagging lines more smoothly.

Once the auto trailer is set up, the fish are typically crowded and netted out of the hatchery pond and transferred into a trough at the front of the trailer. The fish are pumped from the trough into a holding tank for the sorter, which simultaneously measures fish to the nearest millimeter and sends them to one of the six lines based on their size. These lines can handle fish ranging from 250 fish per pound (fpp) to 20 fpp, but with high coefficients of variation (CVs), six lines may not be enough to accommodate the required size range, and out-sized fish must be manually-clipped and tagged. Sorted fish sorted volitionally enter the line, which can simultaneously clip and tag the fish, and check for missed-clips and rejected tags. Any possible miss-marked fish are sent to a reject bucket, where they can be either passed through the sorter again or manually-clipped or tagged. Afterwards, the fish can be sent directly to a hatchery pond for further rearing and release.

After tagging, a sub-sample of fish serve as a quality control group; they are held at the hatchery for 20 to 30 days, and are sampled for tag loss and clip rate. The auto trailers provide a highly-efficient method for marking fish; mortality rates have been observed at <0.1%, with clip rates at >99%, and tag retention observed at >98%.

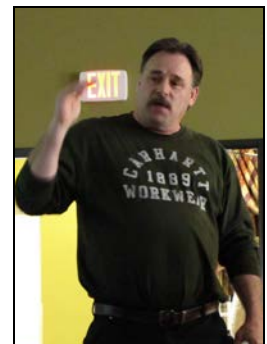


Top: Marked (adipose fin-clipped) vs. unmarked fish (WDFW photo). **Center left:** Fish are sorted by size from the trough and sent to the line. **Center right:** Sorted fish enter the line volitionally. **Bottom left:** Fin clipper used in the line. **Bottom right:** Clipping and tagging lines. **Photos by Lori Kishimoto**

Spokane Hatchery Case Study for JLARC results in Innovator's Award

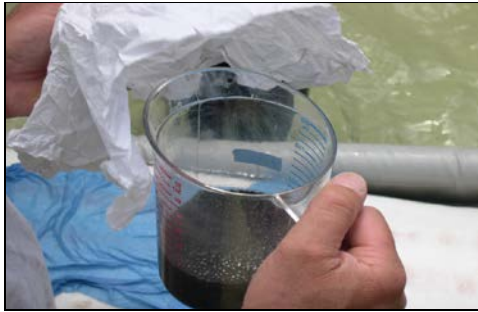
Rich Watson (Spokane Hatcheries Complex Manager) and **Ace Trump** (FHS4 Spokane Hatchery) received recognition for their work at the Annual WDFW Employee Recognition and Service Awards Ceremony, held in Olympia on May 14, 2003. The Innovator's Award recognizes employees who have improved efficiency, created cost savings or cost avoidance, improved service, and shown creativity or originality in assisting WDFW's mission. Rich and Ace developed a worksheet that detailed a breakdown of production costs for the Spokane Hatchery rainbow trout program. This model will be used to identify fish operational costs at all WDFW facilities, statewide.

Following the 2012 Legislative Session, the Joint Legislative Audit Review Committee (JLARC) was instructed to conduct an audit of the WDFW's Inland Trout Stocking program, to compare WDFW's costs specific to trout production activities with private aquaculture (see also *Intake: October 2012*):



Continued on pg 6

Columbia River White Sturgeon Continued from pg 1



Canada, on the Upper-Columbia River. Feasibility studies determined that the **Columbia Basin Hatchery** was the optimal location for juvenile rearing, due to ideal water temperatures and ample space and water to rear 4,000 sturgeon annually.

In May 2004, 1,881 juvenile white sturgeon were successfully released



into Lake Roosevelt, representing the first introduction of hatchery-reared sturgeon into these waters. In 2006, after expanding the Canadian-sourced program, the U.S. aquaculture program suspended Canadian outsourcing and developed its own broodstock collection and spawning program. At that time, **Sherman Creek Hatchery** was selected as an interim broodstock holding and spawning facility, due to its proximity to Lake Roosevelt.

In 2010, WDFW experimented with the capture of wild larvae as an alternative to brood capture, in the hope that wild larvae collection would reduce stress on mature sturgeon and promote a higher level of genetic diversity. The program proved positive; the adult broodstock capture was discontinued, and the entire production shifted to wild-caught larvae in 2011 (for additional information, see www.uppercolumbiasturgeon.org).



In 2010, Chelan and **Grant County PUDs** began capturing wild broodstock for the Mid-Columbia Hatchery Supplementation Program. The PUDs contracted with **Yakama Nation Fisheries** and **Golder Associates** to capture broodstock using setline fishing techniques. Populations from the Mid-Columbia reservoirs, where supplementation is planned with potential local genetic adaptations, were initially targeted. Acquiring enough viable broodstock was difficult, due to low population numbers and the fact that only a relatively small portion of mature sturgeon spawn in a given year. Subsequently, in 2011, some fishing effort was moved to lower reservoirs with higher populations, and alternative techniques were explored. **Blue Leaf Environmental** was contracted to test the practicality of utilizing local fishing guides and hook-and-line gear. Using local anglers' knowledge of sturgeon fishing and the ability to fish in much faster flows

Top left: Expressing white sturgeon eggs.

Top right: Sturgeon eggs in a beaker.

Center: Collecting wild sturgeon larvae.

Bottom: Juvenile sturgeon held at Sherman Creek Hatchery. **Photos from Mitch Combs.**



has produced a valuable addition to the cooperative collection effort.

In 2013, efforts were expanded to include 12 days of broodstock fishing and indexing activities. PIT-tagged fish will be recaptured and are used to estimate growth, survival, condition factors, and abundance levels. Mature sturgeon brought to shore received the same workup as the juveniles: sex and stage of maturity were determined using surgical biopsy. Ripe adults are transported to the Yakama Nation's **Marion Drain Hatchery**, where the eggs are manually fertilized and will hatch within two weeks; the adults are returned to their original waters. The hatchery can raise about 40,000 sturgeon at a time; after a year, they will be released into the Rocky Reach, Wanapum, and Priest Rapids reservoirs.

Broodstock collection: Fish are checked for the PIT tag (top left), and measured (top right).

Photos by Jill Cady

Continued on pg 6

JLARC Continued from pg 4

- What are WDFW's total costs to produce a trout at WDFW's hatcheries?
- What alternative approaches to trout production are available, and what are the costs of these approaches?
- What have other states' experiences been in contracting or using other alternative approaches to trout production?

To obtain estimates that could be compared with private sector prices, WDFW completed a case study of the estimated costs to grow rainbow trout at the Spokane Hatchery during Fiscal Year 2012. The case study focused on rainbow trout because it accounts for over 75% of WDFW's total number of trout releases. Spokane Hatchery was selected for the case study because:

- It is agency's largest trout hatchery, accounting for almost one-quarter of all pounds of trout WDFW produces annually;
- It produces and releases all fish sizes to meet fisheries management objectives;
- It distributes fish to a broad area, which makes it a suitable example of transportation and fish stocking costs; and
- It has a diversified funding base, with funding provided from multiple sources.

Rich and Ace's work provided a detailed estimated cost breakdown for each size of fish, including the costs for labor, fish feed, utilities, transportation, and more. (e.g. vaccinations and chemicals). Compiling this data into a useful format required an in-depth review of existing Spokane Hatchery information on trout production and budget expenditures, and development of a spreadsheet assessment tool to effectively compile diverse forms of information from several data sets. Results confirmed that WDFW produces fish at a lower cost than the private sector; that WDFW conducts its hatcheries in a "business-like manner"; and that we are cost-effective in propagating fish.

In response, JLARC would like to see production costs for all species (including salmon) by size and facility (not including PUD and Mitchell Act-funded programs). Over the summer, all WDFW hatcheries will apply the model developed by Rich Watson and Ace Trump for the Spokane Hatchery audit. The final draft results will be provided to JLARC by December 2013.

The spreadsheet/model that Rich and Ace helped develop will be applied to all WDFW facilities. This tool includes mechanisms to identify fish production cost data for each hatchery by fish species, and size, and can help implement strategies to maximize fish food conversion rates through optimization of feeding regimes. Their work has helped Fish Program create a path forward to assist WDFW in meeting these JLARC requests, and will ultimately help the Department in meeting our goals through cost effective and sustainable fish production for recreational and commercial harvest.

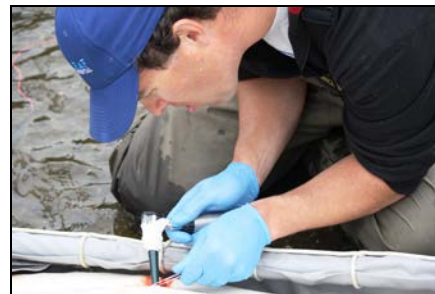


Sturgeon Continued from pg 5

On May 21, 2013, WDFW Hatcheries staff members performed a broodstock collection effort below the McNary Dam. The day's work resulted in numerous juvenile sturgeon PIT-tagged and measured before release. One ripe female was transported to Marion Drain Hatchery; affectionately named "Hanna Banana," the 9-foot 9-inch female weighed in at 429 pounds! This year, the overall effort brought in three ripe males and three ripe females; Hanna Banana contributed ¼ of the female genes to the Mid-Columbia supplementation program!

With a growing awareness of the need to preserve these living fossils, it is exciting to see the future of white sturgeon rehabilitation. WDFW hatcheries are developing cutting-edge propagation and collection techniques, and the cooperation between county, tribal, and environmental groups are making great strides in protecting such a valuable resource in the Columbia River.

Special thanks to **Mitch Combs**, FHS3 Sherman Creek Hatchery (WDFW); **Corey Wright** and **Leah Sullivan**, Senior Fishery Biologists-Blue Leaf Environmental; and **Lance Keller**, Fisheries Biologist-Chelan County PUD.



Right top: Fish are surgically examined for sex and maturity. Right bottom: A scute is removed to indicate a previously-sampled fish.

Left: "Hanna Banana" is gently moved into the transport truck.

Photos by Jill Cady.
Photo by Corey Wright

Catie-Kelly Corner: *Warren Water Broom*

By Ann West, Science Division/ BDS-Hatchery Data Section

Sol Duc Hatchery has found a great new vacuum head for pond cleaning. The all-aluminum *Oregon Dredge*, from *Warren Water Broom MFG* in Astoria OR, is 20-inches wide and designed to use the same bristles as the *Warren Water Broom*. The wheels have a double threads lock design to prevent them from falling off the unit. Because the light-weight water broom is easier to maneuver and covers more area of the raceway, vacuuming process is more efficient, with less physical exertion on staff. According to **Brian Russell** (FHS4) they have been able to vacuum the raceways three to four times faster than before!

The one disadvantage is that the broom is unable to vacuum the edge of the pond within 3 to 4 inches of the raceway wall.

This has recently become the recommended standard vacuum head for hatcheries. For more information, go to <http://www.warrenwaterbroom.com/Products.html>.

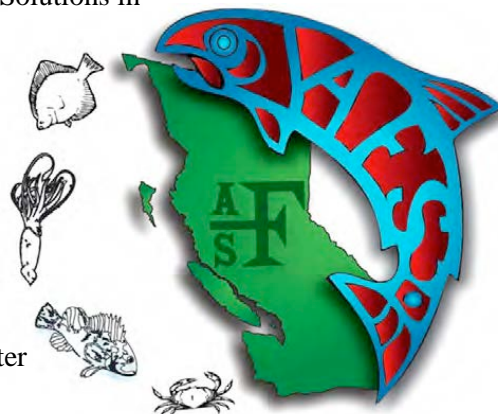


AFS Update By Brian Missildine, HEAT Unit Lead, AFS WA-BC Chapter President-elect

I want to thank all of you WDFW folks who attended our Annual General Meeting (AGM) at Campbell's Resort in Chelan, March 25-28. I thoroughly enjoyed the venue and the company. This year's AGM was a bit smaller than usual, mainly due to the Federal sequestration, but overall I received a lot of positive feedback. We had approximately 90 members in attendance (normal attendance is upwards of 140 members), with over 40 oral and 10 poster presentations, and including a symposium on "Hatchery Challenges and Solutions in the Columbia Watershed." We hope to bolster that number in 2014 by moving the venue back to the west side where WDFW's own **Matt Klungle** (Wild Salmon Production Unit/Science Division) will be heading up the AGM.

I have to admit, one of my favorite talks was in our opening plenary session where former DFW and now Grant County PUD staff member, **Todd Pearsons**, gave a rousing talk on the musings of a middle-aged fisheries biologist; I think he has a career as a motivational speaker. Turns out, Todd is also quite the master of the juice harp, as he played with the band!

I hope to see more WDFW staff participation in our next AGM, and if you have any questions or comments about the Washington-British Columbia Chapter of the American Fisheries Society, shoot me an email!



Staff Happenings By Jill Cady, Hatcheries Division Admin Assistant

With best regards, we wish the following employees success in their new positions:

Region 1

Tim Kuzan, FHS 1-in training, **Lyons Ferry Hatchery**
Dan Pounds, FHS 1-in training, **Lyons Ferry Hatchery**

Region 3

Bruce Ault, FHS 2, lateral transfer, **Ringold Hatchery**

Region 4

Joseph Korzac, FHS 2, **Sunset Falls**

Region 6

Phil Cook, FHS 3, lateral transfer, **Nemah Hatchery**

Region 5

Tony Berry, FHS 2 **Cowlitz Trout Hatchery**, transfer to **Licensing**

Dan Stemple, FHS 2, transfer from **Cowlitz Trout Hatchery**, to **Humptulips Hatchery** (July)

Colin Mathieson, FHS2, transfer from **Lyons Ferry Hatchery** to **Kalama Falls Hatchery**

John Hynes, FHS 1-in training, **Cowlitz Salmon Hatchery**

Logan Flitton, FHS 1-in training, **Cowlitz Salmon Hatchery**

Also, please join me in wishing all the very best to the following on their well-deserved retirement and new adventures:

William Richer, FHS 3 at **Wallace River Hatchery**, June 21, 2013

Sol Duc Hatchery Tests New Drug for Preventing Parasite Infection

By Maria Parnel, Science Division/ BDS-Hatchery Data Section

Cryptobia salmositica is a protozoan parasite that has been reported in all species of Pacific salmon (*Oncorhynchus* spp.). Its main vector is a freshwater leech, *Piscicola salmositica*, and is analogous to the parasite that causes “sleeping sickness” in mammals. WDFW must find a suitable replacement for isometamidium chloride (IMC), the drug currently used (Chen et al. 2011). *C. salmositica* can cause up to 60% mortality in adults returning to the hatchery. Without preventative treatment, hatchery staff would need to collect additional broodstock in order to make program egg-take goals. Only two years of IMC remain, so a suitable replacement must be found.

Staff at **Sol Duc Hatchery**, on the Olympic Peninsula, have been collecting Summer Chinook since May. This summer, WDFW is investigating the effectiveness of Clindamycin to determine if it is a suitable replacement. After collection, fish are treated with either IMC or Clindamycin via injection. Pre-spawn mortalities will be necropsied to determine cause of death. If this drug is found to be ineffective, it is likely that another treatment such as Rifampin will be tested next season.

Citation:

Chen, M.F. et al 2011. Isometamidium Chloride Reduces Mortality of Adult Chinook Salmon due to *Cryptobia salmositica*. North American Journal of Aquaculture 73:304-310

Special thanks to **Brian Russell** (FHS4) and **Brandon Kilmer** (FHS3), Sol Duc Hatchery; and **Jed Varney**, Fish Health Specialist/Conservation Biology Unit.



Top Left: Adults are collected at hatchery trap and then transported in a tote with MS-222, salt (which helps remove leeches), and baking soda. **Top Right:** After collection, fish are banded to check for coded-wire tags.

Above-left: Fish are weighed to determine proper dose of medication. **Center Right:** Fish are injected with either Clindamycin or isometamidium chloride (IMC) **Right:** Adults are placed in shaded circular ponds until ready to spawn.

Photos by Maria Parnel



Washington Department of Fish and Wildlife Hatcheries Division 600 Capitol Way N., Olympia, WA 98501

The Washington Department of Fish and Wildlife (WDFW) serves Washington’s citizens by protecting, restoring and enhancing fish and wildlife and their habitats, while providing sustainable and wildlife-related recreational and commercial opportunities.

Comments are always welcome and much appreciated. This newsletter is for you; to keep us connected, share information, and motivate us to new levels of scientific exchange and hatchery management. Suggestions are being taken for future articles. Tell us what you want to read about!

– Contact: **Lori Kishimoto**

The Intake is also available on the [WDFW web page](http://wdfw.wa.gov/hatcheries/newsletter.html) at <http://wdfw.wa.gov/hatcheries/newsletter.html>

<mailto:fishpgm@dfw.wa.gov>

<http://wdfw.wa.gov/fish/management/hatcheries.html>